

REVIEW ARTICLE

A systematic review of pregnancy outcomes and management in polycystic ovary syndrome

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Williams O. Odunvbun¹, Obatawwe Ukoba^{2*}, Jerry K. Isogun¹ and Amos Ekoh¹

Department of Obstetrics and Gynaecology, College of health sciences, Delta State University, Abraka, Delta State, Nigeria¹. Department of Community Medicine, Delta State University Teaching Hospital (DELSUTH), Oghara, Delta State, Nigeria²

*For Correspondence: Email: ukobaobatawwe@gmail.com; Phone: +2348032785281

Abstract

Polycystic Ovary Syndrome (PCOS) now known as Polyendocrine Metabolic Ovarian Syndrome (PMOS), affects 5-20% of women of reproductive age, it is the leading cause of anovulatory infertility accounting for 70-90% of cases and resulting in lower natural conception rates and a significant contributor to adverse pregnancy outcomes. Following PRISMA 2020 guidelines, this systematic review synthesized evidence from 2014–2025, evaluating the evolving landscape of PCOS pregnancy management. It explores the relationship between PCOS and reproductive outcomes, details specific maternal and perinatal complications, and discusses the latest evidence-based interventions and emerging therapies to improve pregnancy outcomes and the long-term health of both mother and child. The findings revealed that the syndrome's pathophysiology driven by hyperandrogenism, insulin resistance, and obesity significantly increases the risks of early pregnancy loss, gestational diabetes, and pre-eclampsia. There is a paradigm shift toward individualized, multidisciplinary care. Evidence-based strategies highlight the superiority of letrozole for ovulation induction, the metabolic benefits of metformin, and the necessity of nuanced lifestyle interventions over simple weight-loss models. Furthermore, emerging research into immune-metabolic pathways, such as Interleukin-22, suggests novel therapeutic directions. The review concludes that recognizing PCOS as a high-risk obstetric condition and integrating early metabolic screening into standard care are essential to improving maternal and neonatal outcomes. (*Afr J Reprod Health 2026; 30 [10]: 132-140*).

Keywords: Polycystic Ovary Syndrome (PCOS); Infertility, Pregnancy Management, Hyperandrogenism, Insulin Resistance

Résumé

Le syndrome des ovaires polykystiques (SOPK), maintenant connu sous le nom de syndrome métabolique ovarien polyendocrinien (PMOS), qui touche 5 à 20 % des femmes en âge de procréer, est la principale cause d'infertilité anovulatoire (70 à 90 % des cas). Il entraîne une diminution des taux de conception naturelle et contribue significativement aux complications de la grossesse. Conformément aux recommandations PRISMA 2020, cette revue systématique a synthétisé les données probantes de 2014 à 2025, évaluant l'évolution de la prise en charge des grossesses chez les femmes atteintes de SOPK. Elle explore la relation entre le SOPK et les issues de la reproduction, détaille les complications maternelles et périnatales spécifiques et présente les interventions fondées sur des données probantes les plus récentes ainsi que les thérapies émergentes visant à améliorer les issues de grossesse et la santé à long terme de la mère et de l'enfant. Les résultats ont révélé que la physiopathologie du syndrome, caractérisée par un hyperandrogénisme, une résistance à l'insuline et une obésité, augmente significativement les risques de fausse couche précoce, de diabète gestationnel et de prééclampsie. On observe un changement de paradigme vers une prise en charge individualisée et multidisciplinaire. Les stratégies fondées sur des données probantes soulignent la supériorité du létrazole pour l'induction de l'ovulation, les bénéfices métaboliques de la metformine et la nécessité d'interventions nuancées sur le mode de vie plutôt que de simples programmes de perte de poids. De plus, les recherches émergentes sur les voies immunométaboliques, telles que l'interleukine-22, suggèrent de nouvelles pistes thérapeutiques. Cette revue conclut que la reconnaissance du SOPK comme une pathologie obstétricale à haut risque et l'intégration d'un dépistage métabolique précoce dans les soins courants sont essentielles pour améliorer les issues maternelles et néonatales. (*Afr J Reprod Health 2026; 30 [10]: 132-140*).

Mots-clés Syndrome des ovaires polykystiques (SOPK) ; Infertilité ; Prise en charge de la grossesse ; Hyperandrogénisme ; Résistance à l'insuline

Introduction

Polycystic Ovary Syndrome (PCOS) is one of the most prevalent endocrine and metabolic disorders affecting women of reproductive age, with a reported global prevalence ranging from 5% to 20%. It is a heterogeneous condition characterized by hyperandrogenism, ovulatory dysfunction, and polycystic ovarian morphology.^{1,2} The 2003 Rotterdam criteria remain the most widely accepted diagnostic framework, and PCOS is recognized as the leading cause of anovulatory infertility, accounting for approximately 70–90% of cases worldwide.^{1–3} In Nigeria, the reproductive burden of PCOS is substantial, with evidence indicating that the condition contributes to approximately 28.0% of infertility cases in Delta State.⁵

Despite its high prevalence and established association with infertility, PCOS is not consistently recognized as an independent risk factor in routine antenatal care. This limited clinical recognition is concerning, given the growing body of evidence linking PCOS to adverse pregnancy outcomes, including recurrent miscarriage, gestational diabetes mellitus, hypertensive disorders of pregnancy, and pre-eclampsia.^{3–6} The lack of early identification and tailored antenatal management represents a critical gap in current obstetric practice, particularly in low- and middle-income settings.

The pathophysiology of PCOS involves a complex interaction between androgen excess, insulin resistance, and dysregulation of the hypothalamic–pituitary–ovarian axis. These processes impair follicular development, compromise oocyte quality, and increase susceptibility to adverse obstetric and perinatal outcomes.^{1,3} Alterations in steroid hormone biosynthesis, mediated in part by key enzymes such as 3 β -hydroxysteroid dehydrogenase (3 β -HSD) and cytochrome P450 17A1 (CYP17), further contribute to hormonal imbalance and disrupted reproductive function.^{3,21} Beyond reproductive dysfunction, PCOS is frequently accompanied by metabolic and psychological comorbidities, including central obesity, insulin resistance, anxiety, and reduced quality of life.^{1,4,11} These overlapping manifestations highlight the need for comprehensive and individualized approaches to

pregnancy management. In response to these challenges, this review examines evolving concepts in the management of pregnancy among women with PCOS, with the aim of synthesizing current evidence relevant to maternal and fetal outcomes. To guide this review, the following research questions were formulated:

RQ1: How does the pathophysiology of Polycystic Ovary Syndrome influence pregnancy outcomes?

RQ2: What maternal and fetal complications are most commonly associated with pregnancy in women with PCOS?

RQ3: Which evidence-based management strategies are effective in improving pregnancy outcomes among women with PCOS?

Methods

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines as updated by Page et al.²⁴ The PRISMA framework guided the processes of literature identification, screening, eligibility assessment, and inclusion of studies.

Search strategy

A comprehensive literature search was performed across major electronic databases, including PubMed, Scopus, Web of Science, and Google Scholar. The search strategy combined Medical Subject Headings (MeSH) and free-text terms related to *polycystic ovary syndrome*, *pregnancy*, *maternal outcomes*, *fetal outcomes*, and *pregnancy management*. Boolean operators (“AND” and “OR”) were used to refine the search. Additional relevant studies were identified through manual screening of reference lists of included articles. Searches were limited to studies published in English.

Eligibility criteria

Studies were included if they: (i) involved women diagnosed with PCOS using recognized diagnostic criteria; (ii) reported pregnancy-related outcomes or management strategies; and (iii) were published in

peer-reviewed journals. Randomized controlled trials, cohort studies, case-control studies, and systematic reviews from 2014-2025 were considered eligible. Exclusion criteria comprised conference abstracts, editorials, case reports, animal studies, and publications lacking sufficient outcome data.

Study selection

All retrieved records were imported into a reference management system, and duplicates were removed. Two independent reviewers (Odunvbun W.O and Obatavwe U) initially screened titles and abstracts, removing duplicates. Subsequently, three reviewers (Isogun K.J, Amos E and Obatavwe U) independently assessed full texts against eligibility criteria. Discrepancies were resolved through discussion or consultation (Odunvbun W.O and Obatavwe U) to reach consensus. Reasons for exclusion were recorded for transparency, with a PRISMA flow diagram typically illustrating the selection process. A PRISMA flow diagram would typically illustrate the number of records identified, screened, assessed for eligibility, and ultimately included in the final review.

Data extraction

Data extraction followed PRISMA 2020 checklist item 10. Extracted data included study identifiers, design, diagnostic criteria for Polycystic Ovary Syndrome, pregnancy-related maternal and fetal outcomes, and management interventions. Where reported, psychological factors and treatment-related complications were also extracted. Data items were predefined, and extracted information was verified for consistency prior to synthesis.

Quality assessment and data synthesis

The methodological quality of included studies was assessed using appropriate critical appraisal tools based on study design. Due to heterogeneity in study designs, outcome measures, and interventions, a narrative synthesis was undertaken. Findings were synthesized thematically in line with the review's research questions, focusing on pathophysiological mechanisms, pregnancy-related

complications, and evolving management strategies for women with PCOS.

Results

The systematic search identified studies examining Polycystic Ovary Syndrome (PCOS) and pregnancy-related outcomes across global and regional contexts, including low- and middle-income countries. Following database searching, duplicate removal, and eligibility assessment, a total of 17 studies met the inclusion criteria and were included in the final synthesis. The included studies comprised randomized controlled trials, cohort studies, case-control studies, systematic and narrative reviews, with publication years ranging from 2014 to 2025. Figure 1 presents the PRISMA 2020 flow diagram detailing the study selection process.

RQ1: How does the pathophysiology of polycystic ovary syndrome influence pregnancy outcomes?

Across the included studies, PCOS was consistently described as a multifactorial disorder involving endocrine, metabolic, and neuroendocrine dysregulation. Hyperandrogenism, insulin resistance, obesity, and altered gonadotropin secretion were repeatedly linked to impaired folliculogenesis, reduced oocyte quality, and subfertility. Elevated anti-Müllerian hormone (AMH) levels and chronic low-grade inflammation further complicated diagnosis and treatment response. Table 1 summarizes key pathophysiological mechanisms identified across the included studies and their implications for pregnancy outcomes.

RQ2: What maternal and fetal complications are most commonly associated with pregnancy in women with PCOS?

The reviewed studies consistently reported that women with PCOS experience higher rates of adverse maternal and fetal outcomes compared with women without PCOS. These complications were strongly associated with underlying metabolic dysfunction and obesity. Psychological stress and

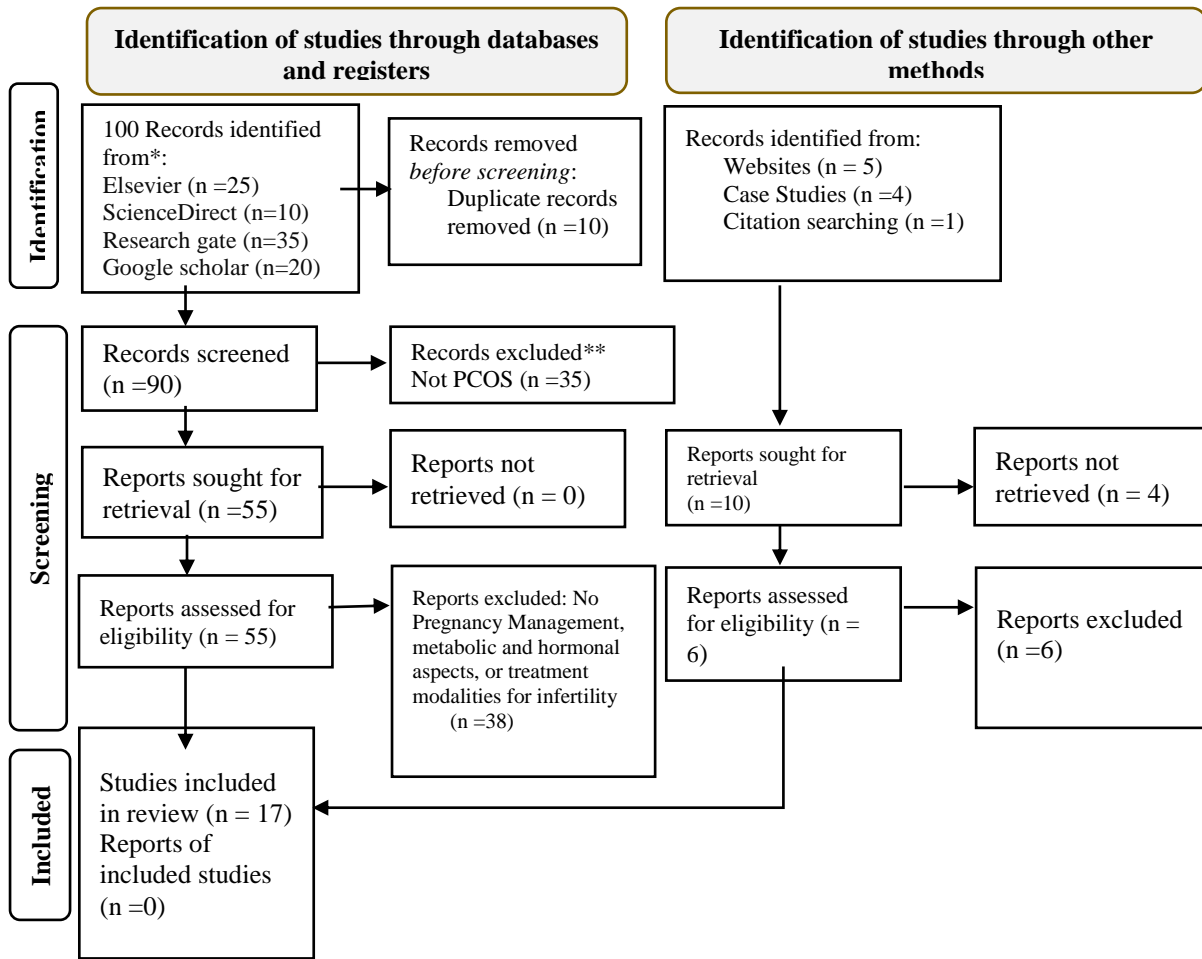


Figure 1: PRISMA 2020 flow diagram for the study which included searches of databases, registers and other sources. (Source: Page et al.)²⁴

Table 1: Pathophysiological mechanisms of PCOS and implications for pregnancy outcomes

Pathophysiological Factor	Key Findings	Implications for Pregnancy Outcomes	Key Study Reference(s)
Hyperandrogenism	Excess androgen production disrupts follicular development and ovulation	Increased anovulation, poor oocyte quality, early pregnancy loss	Saadia. ¹⁷ ; Etrusco et al. ²³
Insulin resistance	Present in lean and obese women with PCOS; linked to metabolic dysfunction	Higher risk of miscarriage, GDM, and pre-eclampsia	Christopherson. ¹² Reyes-Muñoz et al. ⁹
Obesity and central adiposity	Visceral fat exacerbates hormonal imbalance and inflammation	Reduced fertility, poorer ART outcomes	Jacob & Balen. ¹⁴ Rehman et al. ²¹
Altered gonadotropin secretion	Elevated LH and disrupted LH/FSH ratio	Impaired folliculogenesis and ovulatory dysfunction	Etrusco et al. ²³
Elevated AMH levels	Reflects increased follicle number and arrested follicular growth	Diagnostic challenges; increased risk of OHSS	Kshetrimayum et al. ²²

Table 2: Maternal and fetal complications associated with PCOS in pregnancy

Complication Category	Specific Outcomes	Evidence from Included Studies	Key Study Reference(s)
Early pregnancy complications	Miscarriage, implantation failure	Significantly higher miscarriage rates in PCOS	Saadia. ¹⁷ ; Reyes-Muñoz et al. ⁹
Metabolic complications	Gestational diabetes mellitus	Strong association with insulin resistance and obesity	Christopherson. ¹² ; Attia et al. ¹⁵
Hypertensive disorders	Gestational hypertension, pre-eclampsia	Increased risk compared with non-PCOS pregnancies	Jacob & Balen. ¹⁴
ART-related complications	Ovarian hyperstimulation syndrome (OHSS)	Higher incidence in women with elevated AMH	Kshetrimayum et al. ²² ; Rehman et al. ²¹
Psychological impact	Anxiety, treatment-related stress	Poor information access and treatment burden reported	Holton et al. ¹³ ; Herbert & Woolf. ¹¹

Table 3: Evidence-based management strategies for improving pregnancy outcomes in PCOS

Intervention Type	Key Findings	Implications for Pregnancy Management	Key Study Reference(s)
Lifestyle modification	Diet and physical activity improve metabolic and ovulatory function	Recommended as first-line or adjunct therapy	Lin ⁸ ; Herbert & Woolf ¹¹
Metformin therapy	Improves insulin sensitivity and ovulation	Reduces metabolic risk and improves fertility	Attia et al. ¹⁵ ; Christopherson ¹²
Ovulation induction	Letrozole superior to clomiphene citrate	Shift in first-line ovulation induction agents	Rocha et al. ¹⁸
ART optimization	Obesity negatively affects IVF/ICSI outcomes	Need for individualized ART protocols	Rehman et al. ²¹
Emerging therapies	IL-22 targets metabolic and immune dysfunction	Potential future therapeutic avenue	Geng et al. ²⁰

poor access to accurate health information were also noted as indirect contributors to adverse outcomes. Table 2 summarizes the maternal and fetal complications most frequently reported across included studies.

RQ3: Which evidence-based management strategies are effective in improving pregnancy outcomes among women with PCOS?

Management strategies identified across the included studies demonstrated a clear shift toward individualized and integrated care models. Lifestyle modification, pharmacological therapy, and tailored assisted reproductive techniques were repeatedly emphasized as central to improving reproductive outcomes. Emerging therapies targeting inflammatory and immune pathways were also reported. Table 3 presents key intervention

strategies and their implications for pregnancy management

Discussion

This systematic review provides a comprehensive synthesis of current evidence on Polycystic Ovary Syndrome (PCOS) and pregnancy management, highlighting how underlying pathophysiological mechanisms, associated maternal–fetal complications, and evolving therapeutic strategies collectively influence reproductive outcomes. The findings reinforce the recognition of PCOS as a complex, multisystem disorder with implications that extend beyond infertility to encompass metabolic, obstetric, and psychological health.

Pathophysiology of PCOS and its influence on pregnancy outcomes

The reviewed studies consistently demonstrate that adverse pregnancy outcomes in women with PCOS

are driven by interconnected endocrine and metabolic disturbances rather than isolated ovarian dysfunction. Hyperandrogenism emerged as a central pathological feature, disrupting follicular development and ovulation and contributing to poor oocyte quality and early pregnancy loss.^{17, 23} Excess androgen production alters granulosa cell function and follicular maturation, thereby reducing implantation potential and increasing the likelihood of subfertility.^{17, 23}

Insulin resistance was identified as a key metabolic abnormality present in both lean and obese women with PCOS, underscoring its independent role in reproductive dysfunction.^{12, 9} By exacerbating ovarian androgen production and impairing endometrial receptivity, insulin resistance increases the risk of miscarriage, gestational diabetes mellitus, and hypertensive disorders of pregnancy. These findings support the growing consensus that metabolic health is a critical determinant of pregnancy outcomes in PCOS. Obesity, particularly central adiposity, further compounds hormonal imbalance and systemic inflammation, leading to poorer reproductive and assisted reproductive technology (ART) outcomes.^{14, 21} The association between visceral fat accumulation and reduced ART success highlights the need for metabolic optimization prior to gestational diabetes not only affects immediate pregnancy outcomes but also increases the long-term risk of type 2 diabetes and cardiovascular disease in both mother and offspring. Hypertensive disorders of pregnancy, including gestational hypertension and pre-eclampsia, were also more prevalent among women with PCOS, likely mediated by endothelial dysfunction, chronic inflammation, and metabolic stress.¹⁴

In ART settings, women with PCOS were shown to have a higher incidence of ovarian hyperstimulation syndrome, particularly in the presence of elevated AMH levels and obesity.^{12, 21} These findings highlight the need for cautious stimulation protocols and individualized risk assessment. Psychological impacts, including anxiety and treatment-related stress, were also evident, with poor access to reliable information and prolonged treatment burden contributing to reduced quality of life.^{13, 11} Although often overlooked, these psychosocial factors may

conception. Additionally, elevated anti-Müllerian hormone levels were shown to reflect arrested follicular growth and increased follicle number, complicating diagnosis and increasing the risk of ovarian hyperstimulation syndrome during fertility treatment.²² Collectively, these findings emphasize that PCOS-related pregnancy risks are rooted in systemic dysregulation involving hormonal, metabolic, and inflammatory pathways.

Maternal and fetal complications in PCOS pregnancies

The results confirm that women with PCOS experience a disproportionately higher burden of adverse maternal and fetal outcomes compared with non-PCOS populations. Early pregnancy complications, particularly miscarriage and implantation failure, were consistently reported across studies, reflecting impaired endometrial receptivity and oocyte competence.^{17, 9} These findings reinforce earlier observations that subfertility in PCOS persists beyond conception and extends into early gestation. Metabolic complications, especially gestational diabetes mellitus, were strongly associated with insulin resistance and obesity in PCOS pregnancies.^{12, 15} This association is clinically significant, as

indirectly affect adherence to treatment and pregnancy outcomes.

Evolving evidence-based management strategies

A notable finding of this review is the shift toward individualized and integrated management strategies for improving pregnancy outcomes in women with PCOS. Lifestyle modification, encompassing dietary changes and physical activity, was consistently recommended as a first-line or adjunctive intervention due to its positive effects on metabolic and ovulatory function.^{8, 11} Importantly, recent perspectives advocate moving away from purely weight-centric approaches toward sustainable lifestyle interventions that address insulin resistance and cardiometabolic risk.

Pharmacological therapy remains a cornerstone of PCOS management. Metformin was widely supported for its ability to improve insulin sensitivity, promote ovulation, and reduce metabolic risk, particularly in women with insulin-

resistant PCOS.^{12,15} In ovulation induction, evidence increasingly favors letrozole over clomiphene citrate, signaling a paradigm shift in first-line fertility treatment for PCOS-related infertility.¹⁸ This shift reflects improved ovulation and pregnancy rates with fewer adverse effects. In ART contexts, the reviewed studies emphasized the importance of individualized treatment protocols, particularly for obese women and those with high AMH levels, to optimize outcomes and minimize complications (Rehman *et al.*²¹). Emerging research exploring immune and inflammatory pathways, such as the role of interleukin-22 in regulating metabolic and immune dysfunction, suggests promising future therapeutic avenues beyond traditional hormonal and metabolic interventions.²⁰

Implications for clinical practice and research

The findings of this review underscore the need to recognize PCOS as an independent risk factor in pregnancy care. Effective management requires a multidisciplinary approach that integrates metabolic control, reproductive health, and psychological support. Early identification, preconception counseling, and individualized antenatal monitoring may substantially reduce adverse outcomes. Despite advances in understanding PCOS and pregnancy management, gaps remain, particularly regarding variability in diagnostic criteria, heterogeneity of PCOS phenotypes, and limited context-specific evidence from low- and middle-income countries. Future research should focus on longitudinal and population-specific studies to refine risk stratification and optimize management strategies across diverse healthcare settings.

Strengths

The strength of the study lies in its rigorous methodological adherence to the PRISMA 2020 guidelines, ensuring a transparent and reproducible systematic review. By synthesizing a decade of contemporary data, it captures the paradigm shift toward individualized, multidisciplinary care and emerging immune-metabolic therapies like Interleukin-22. Furthermore, its focus on the mechanistic interplay between hyperandrogenism

and adverse perinatal outcomes provides a robust clinical framework for modern obstetric risk management.

Limitations

A significant limitation is the inherent heterogeneity of PCOS phenotypes across the included studies, which may complicate the universal application of its clinical findings. While the review covers a wide timeframe, the scarcity of long-term longitudinal data on neonatal metabolic health limits its conclusions regarding the syndrome's intergenerational impact. Additionally, the reliance on published literature introduces a potential publication bias, possibly overlooking inconclusive or negative results regarding emerging therapies.

Conclusion and recommendations

This systematic review confirms that Polycystic Ovary Syndrome is a multifaceted endocrine–metabolic disorder with substantial implications for pregnancy outcomes. The reviewed evidence demonstrates that hyperandrogenism, insulin resistance, obesity, chronic inflammation, and neuroendocrine dysregulation collectively contribute to subfertility, early pregnancy loss, gestational diabetes mellitus, hypertensive disorders, and assisted reproductive technology–related complications. Psychological stress and inadequate access to accurate health information further exacerbate these risks, underscoring the need for comprehensive and context-sensitive pregnancy management approaches for women with PCOS.

Clinical practice should prioritize early identification of PCOS as an independent obstetric risk factor. Preconception and antenatal care should include routine metabolic screening, weight management, and individualized ovulation induction and ART protocols to reduce maternal and fetal complications. Lifestyle modification should remain first-line therapy, supported by evidence-based pharmacological interventions such as metformin and letrozole where indicated. Integration of psychological support and patient education into routine care is essential to improve

treatment adherence and overall pregnancy outcomes. Policy-level interventions should focus on incorporating PCOS-specific risk assessment and management guidelines into national reproductive and maternal health frameworks, particularly in low- and middle-income settings. Strengthening access to multidisciplinary care, improving clinician training on PCOS-related pregnancy risks, and ensuring availability of affordable metabolic and reproductive health services are critical to reducing preventable adverse outcomes. Public health policies should also emphasize early diagnosis and health education to address long-term metabolic and reproductive consequences.

Future research should prioritize well-designed longitudinal and interventional studies to clarify causal pathways linking PCOS pathophysiology to adverse pregnancy outcomes. Standardization of diagnostic criteria, outcome measures, and reporting across studies is necessary to enhance comparability and clinical translation. Further investigation into emerging immunometabolic therapies and context-specific evidence from underrepresented regions will be vital in refining personalized and equitable pregnancy management strategies for women with PCOS.

Data availability

The datasets analyzed during the current systematic review are derived from published peer-reviewed studies and clinical trials available in electronic databases including PubMed, Scopus, and Cochrane Library. All supporting data and extracted evidence syntheses generated during this study are included within the article and its supplementary materials. Further inquiries regarding the specific data extraction sheets or specialized protocols can be directed to the corresponding author upon reasonable request.

Authors' contributions

Both Odunvbun W.O and Obatavwe U, were involved in conceptualization and design of the study. Isogun K.J, Amos E and Obatavwe U were involved in data collection/acquisition and

statistical analysis. All authors (Odunvbun W.O, Obatavwe U, Isogun K.J, and Amos E) were involved in the writing and revising the manuscript for intellectual content. All authors read, and approved the final manuscript and agreed to be accountable for all aspects of the work.

Conflict of interest

Authors have no conflict of interest to declare.

References

1. Cunha A, and Póvoa AM. Infertility management in women with polycystic ovary syndrome: a review. *Porto Biomed J.* 2021 Jan 26;6(1):e116.
2. Li Z, Wang YH, Wang LL, Hu DT, Teng Y, Zhang TY, Yan ZY, Wang F, and Zou YF. Polycystic ovary syndrome and the risk of endometrial, ovarian and breast cancer: An updated meta-analysis. *Scott Med J.* 2022 Aug;67(3):109-120.
3. McDonnell R, and Hart RJ. Pregnancy-related outcomes for women with polycystic ovary syndrome. *Womens Health (Lond).* 2017 Dec;13(3):89-97.
4. Bahri Khomami M, Teede HJ, Joham AE, Moran LJ, Piltonen TT, and Boyle JA. Clinical management of pregnancy in women with polycystic ovary syndrome: an expert opinion. *Clin Endocrinol (Oxf).* 2022;97:227-236.
5. Odunvbun WO, Oziga DV, Oyeye LO, and Ojeogwu CL. Pattern of infertility among infertile couple in a secondary health facility in Delta State, South South Nigeria. *Trop J Obstet Gynaecol* 2018;35:244-8
6. Bahri Khomami M, Hashemi S, Shorakae S, Harrison CL, Piltonen TT, Romualdi D, Tay CT, Mousa A, Vanky E, and Teede HJ. Systematic review and meta-analysis of birth outcomes in women with polycystic ovary syndrome. *Nat Commun.* 2024 Jul 4;15(1):5592.
7. Okoroafor UC, and Jungheim ES. Incorporating patient preference into the management of infertility in women with polycystic ovary syndrome [Internet]. *ncbi.nlm.nih.gov.* 2012 [cited 2025 Jul 31].
8. Lin AW. Dietary and physical activity behaviors, knowledge, and beliefs associated with polycystic ovary syndrome [pdf]. 2017 [cited 2025 Jul 31].
9. Reyes-Muñoz E, Sathyapalan T, Rossetti P, Shah M, Long M, Buscema M, Valenti G, La Rosa VL, Cianci S, and Vitale SG. Polycystic Ovary Syndrome: Implication for Drug Metabolism on Assisted Reproductive Techniques-A Literature Review. *Adv Ther.* 2018 Nov;35(11):1805-1815.
10. Hart R. Generational Health Impact of PCOS on Women and Their Children [Internet]. *ncbi.nlm.nih.gov.* 2019 [cited 2025 Jul 31].
11. Herbert S, and Woolf K. Moving beyond Weight: A Narrative Review of the Dietary and Lifestyle Management for Reducing Cardiometabolic Risk in

- Polycystic Ovary Syndrome (PCOS) [Internet]. ncbi.nlm.nih.gov. 2023 [cited 2025 Jul 31].
12. Christopherson R. Polycystic Ovary Syndrome Metabolic Comorbidities: A Critical Appraisal of the Evidence With Practice Recommendations [PDF]. 2016 [cited 2025 Jul 31].
 13. Holton S, Hammarberg K, and Johnson L. Fertility concerns and related information needs and preferences of women with PCOS [Internet]. ncbi.nlm.nih.gov. 2018 [cited 2025 Jul 31].
 14. Jacob S, and Balen AH. How Will the New Global Polycystic Ovary Syndrome Guideline Change Our Clinical Practice? [Internet]. ncbi.nlm.nih.gov. 2019 [cited 2025 Jul 31].
 15. Attia GM, Almouteri MM, and Alnakhli FT. Role of Metformin in Polycystic Ovary Syndrome (PCOS)-Related Infertility [Internet]. ncbi.nlm.nih.gov. 2023 [cited 2025 Jul 31].
 16. Choudhari R, Tayade S, Tiwari A, and Satone P. Diagnosis, Management, and Associated Comorbidities of Polycystic Ovary Syndrome: A Narrative Review [Internet]. ncbi.nlm.nih.gov. 2024 [cited 2025 Jul 31].
 17. Saadia OS. Cardiometabolic aspects of the polycystic ovary syndrome [PDF]. 2014 [cited 2025 Jul 31].
 18. Rocha AL, Oliveira FR, Azevedo RC, Silva VA, Peres TM, Candido AL, Gomes KB, and Reis FM. Recent advances in the understanding and management of polycystic ovary syndrome. *F1000Res*. 2019 Apr 26;8:F1000 Faculty Rev-565.
 19. Rajashekar L, Krishna D, and Patil M. Polycystic ovaries and infertility: Our experience [Internet]. ncbi.nlm.nih.gov. 2008 [cited 2025 Jul 31].
 20. Geng Y, Liu Z, Hu R, Ma W, Wu X, Dong H, Song K, Xu X, Huang Y, Li F, Song Y, and Zhang M. Opportunities and challenges: interleukin-22 comprehensively regulates polycystic ovary syndrome from metabolic and immune aspects. *J Ovarian Res*. 2023 Jul 31;16(1):149.
 21. Rehman R, Mustafa R, Ali R, Shaharyar S, and Alam F. Influence of body mass index and polycystic ovarian syndrome on ICSI/IVF treatment outcomes: A study conducted in Pakistani women [PDF]. 2018 [cited 2025 Jul 31].
 22. Kshetrimayum C, Sharma A, Mishra VV, and Kumar S. Polycystic ovarian syndrome: Environmental/occupational, lifestyle factors; an overview [Internet]. ncbi.nlm.nih.gov. 2019 [cited 2025 Jul 31].
 23. Etrusco A, Mikuš M, D'Amato A, Barra F, Planinić P, Goluža T, Buzzaccarini G, Marušić J, Tešanović M, and Laganà AS. Incretin Hormone Secretion in Women with Polycystic Ovary Syndrome: Roles of Obesity, Insulin Sensitivity and Treatment with Metformin and GLP-1s. *Biomedicines*. 2024 Mar 14;12(3):653.
 24. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, Shamseer L, Tetzlaff JM, Akl EA, Brennan SE, Chou R, Glanville J, Grimshaw JM, Hróbjartsson A, Lalu MM, Li T, Loder EW, Mayo-Wilson E, McDonald S, McGuinness LA, Stewart LA, Thomas J, Tricco AC, Welch VA, Whiting P, and Moher D. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021 Mar 29;372:n71.